

Multi Tier Architecture Model On A Server Cluster For Application Of Big Data

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Abstract— This research focused on the development of scientific contributions in the field of network computer, where the results of this research is solutions for developers or practitioner in determining the model topology and routing configuration protocols to suit the needs of the application for big data. Term goals this research such as sustainable road map that are able to produce robustness and reliability networks for application of big data. The methods that Researchers use on this research is PPDIOO (Prepare, plan, design, implementation, operate, and optimize). Researchers limiting stages the use of the methods of development of the network until the stage of the design with the results in the form of the simulation and design of network topology, especially on a business organization or government.

Keywords—multitier; server cluster, big data.

I. INTRODUCTION

The process of handling big data starting from the process of capturing data generated at the time from the source

, and can be analyzed and be valuable information for a decisive decision, either in a business or Government Organization. Current research results based on data posited an average traffic data using the addressing protocol with IP Address will exceed the size of a zettabyte (1000 exabytes) by the end of the year 2016, and will reach 2 zettabytes per year in 2019 [1].

Based on that information, if an organization does not yet have a standard guidelines in preparing for an

applications, both in terms of the selection of routing protocol type that has type static or dynamic.

Supported by the traffic in the form of designing Server Clusters can handle the expected traffic through the allocation of data segmentation. A method that Researchers use in this research is network development PPDIIO (Prepare, plan, design, implementation, operate, & optimize). The researchers limited the use of methods of network development phases to the design stage with the results in the form of simulation and network topology design with type Multi-tiered Model, which is devoted to the medium scale network in an organization business or government.

II. CURRENT RESULTS

Big data brings new traffic and performance related challenges and calls for a deep revisit of the routing protocols that were used for performance evaluation and traffic engineering. Dynamic routing protocols are needed to investigate big data characteristics in terms of 3V (volume, velocity, and variety) and their impact on network performance, new solutions have to be designed to efficiently and securely manage information, new techniques are needed to support all phases of network planning, design and optimization. Each year, various new devices in different form factors with increased capabilities and intelligence are introduced and adopted in the market. A growing number of applications, such as smart meters, video surveillance, healthcare monitoring, transportation, also are causing connection growth. Preparedness routing protocols that supports low overhead updated of routing tables is very crucial for the holistic network.

The growth of mobile-based devices and media on IP traffic becomes an inevitable requirement. This study aims to produce a holistic network for businesses in terms of design architecture and routing protocols, including eventually find out why adaptation to changes in network technology has become so difficult to apply, whether due to constraints on convergence time, or whether because of discrepancies in the existing complex topologies.

Results rather than the lower administrative distances like EIGRP summary route and that the new model for design architecture and routing protocols will be the answer for businesses in addressing the needs and challenges of the era of big data in the future.

The measurement of the value of the cost at the network before using Etherchannel and Routing Protocols to look at some existing nodes on the network, author did a simulations of some sample measurement results and getting the value of Path Cost parameters for exactly on big data application, such as Hadoop or Server Cluster. As for the summary than some sample measurement values for cost spanning tree protocol simulation in network and is having an average value of Path cost of = 19, with a Link speed of 100 Mb/s are as follows:

TABLE I.

Parameter	Link Speed	Recommended value	Recommended range	Range
Path Cost	4 Mb/s	250	100-1000	1-65 535
Path Cost	10 Mb/s	100	50-600	1-65 535
Path Cost	16 Mb/s	62	40-400	1-65 535
Path Cost	100 Mb/s	19	10-60	1-65 535
Path Cost	1 Gb/s	4	3-10	1-65 535
Path Cost	10 Gb/s	2	1-5	1-65 535

Fig. 1. Path Cost Parameter Values

TABLE II.

No	Switch	Interfaces	VLAN ID	Parameter	Link Speed	Rate Value
1	Switch L3 A	Fa0/3	VLAN 1	Path Cost	100 Mb/s	19
2	Switch L3 B	Fa 0/1	VLAN 30	Path Cost	100 Mb/s	19
3	Switch L3 C	Fa 0/2	VLAN 60	Path Cost	100 Mb/s	19
4	Switch L3 D	Fa 0/1 - Fa 0/6	VLAN 1	Path Cost	100 Mb/s	19

Fig. 2. Results for Path Cost Parameter Values

TABLE III.

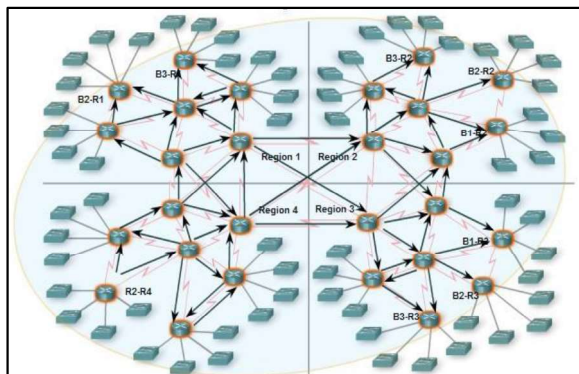


Fig. 3. Convergence Time Model

TABLE IV.

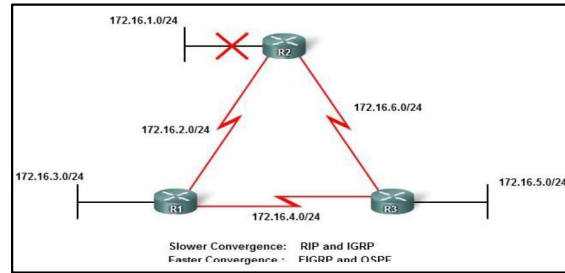


Fig. 4. Comparing Convergence Model

TABLE V.

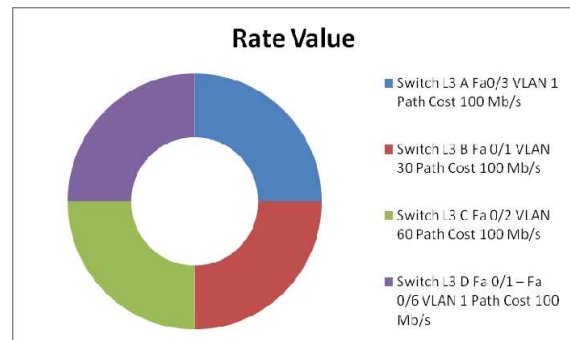


Fig. 5. Results of Rate Value on Server Cluster

References

- [1] B. Lucinda and L. Richard, "The Critical Role of the Network in Big Data Applications." White Paper of Cisco Systems, April 2012.
- [2] Cisco, "The Zettabyte Era: Trends and Analysis", USA. May 2015.
- [3] Cisco, "CCNA Exploration Routing Protocols and Concepts 4.0.0.0", Cisco Materials 2007.
- [4] Hsinchun Chen, Roger H. L. Chiang, Veda C. Storey, "Business Intelligence and Analytics: from Big Data to Big Impact". MIS Quarterly Vol. 36 No. 4/December 2012.
- [5] Morabito, Vincenzo, "Big Data and Analytics Strategic and Organizational Impacts", Springer International Publishing Switzerland 2015.
- [6] Mayer-Schönberger, Viktor, Cukier, Kenneth, "Big Data for Development: Challenges & Opportunities", Houghton Mifflin Harcourt, 2013.